

WHAT IS CLAIMED IS:

1. A thermal recording material comprising, on a support, at least a thermal recording layer and a protective layer containing a water-soluble resin, wherein the thermal recording material comprises a water-soluble or oil-soluble compound of a transition element of the group IV in the long-form periodic table.

2. The thermal recording material of claim 1, wherein the protective layer contains ultrafine inorganic particles.

3. The thermal recording material of claim 1, wherein the compound of a transition element of the group IV in the long-form periodic table is a water-soluble zirconium compound.

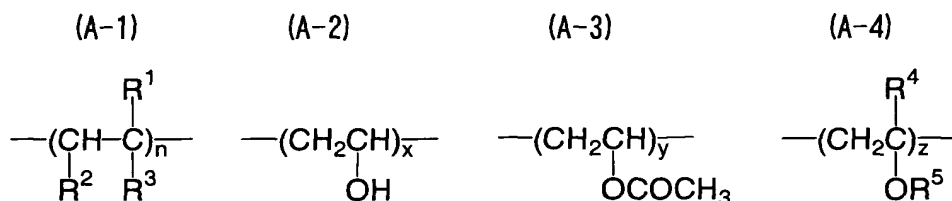
4. The thermal recording material of claim 3, wherein the water-soluble zirconium compound is contained in the protective layer in an amount of 0.1 to 25 % by mass based on the water-soluble resin.

5. The thermal recording material of claim 1, wherein the water-soluble resin is a long-chain alkyl ether-modified polyvinyl alcohol.

6. The thermal recording material of claim 1, wherein water-soluble resin is a long-chain alkyl ether-modified polyvinyl alcohol, which is modified with an alkyl ether group having 8 to 20 carbon atoms.

7. The thermal recording material of claim 1, wherein the water-soluble resin is a long-chain alkyl ether-modified polyvinyl alcohol which comprises monomer units represented by the following general formulae (A-1) to (A-4):

General formulae (A-1) to (A-4)



wherein in general formulae (A-1) to (A-4), R<sup>1</sup> represents a hydrogen atom, a methyl group or -CH<sub>2</sub>CO<sub>2</sub>M; R<sup>2</sup> represents a hydrogen atom, or -CO<sub>2</sub>M; R<sup>3</sup> represents a hydrogen atom, -CO<sub>2</sub>M, an amino group, an amido group, a substituted amido group, a hydroxyl group, a glycidyl group, a sulfonic acid group, a polyethylene oxide group, a polypropylene oxide group or a group having at least one of these functional groups; R<sup>4</sup> represents a hydrogen atom or a methyl group; R<sup>5</sup> represents an alkyl group having 8 to 20 carbon atoms; M represents a hydrogen atom, an alkyl group, an aryl group, an aralkyl group, Na, K or Li; and n, x, y and z each represent a degree of polymerization.

8. A thermal recording material comprising, on a support, a thermal recording layer and a protective layer which comprises at least polyvinyl alcohol and ultrafine

inorganic particles, wherein the thermal recording material comprises boric acid and a water-soluble zirconium compound.

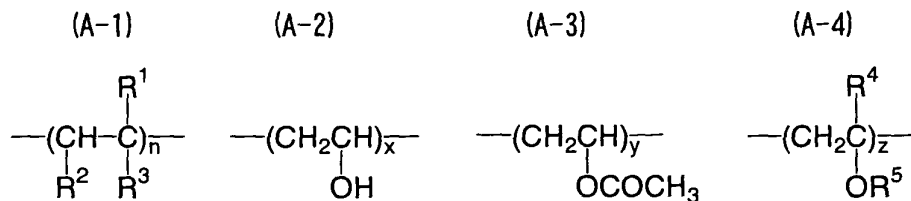
9. The thermal recording material of claim 8, wherein the ultrafine inorganic particles are barium sulfate particles having an average particle size of 0.05 to 0.20  $\mu\text{m}$ .

10. The thermal recording material of claim 8, wherein the polyvinyl alcohol is a long-chain alkyl ether-modified polyvinyl alcohol.

11. The thermal recording material of claim 8, wherein the polyvinyl alcohol is a long-chain alkyl ether-modified polyvinyl alcohol, which is modified with an alkyl ether group having 8 to 20 carbon atoms.

12. The thermal recording material of claim 8, wherein the polyvinyl alcohol is a long-chain alkyl ether-modified polyvinyl alcohol which comprises monomer units represented by the following general formulae (A-1) to (A-4):

General formulae (A-1) to (A-4)



wherein in general formulae (A-1) to (A-4), R<sup>1</sup> represents a hydrogen atom, a methyl group or -CH<sub>2</sub>CO<sub>2</sub>M; R<sup>2</sup> represents a hydrogen atom, or -CO<sub>2</sub>M; R<sup>3</sup> represents a hydrogen atom, -CO<sub>2</sub>M, an amino group, an amido group, a substituted amido group, a hydroxyl group, a glycidyl group, a sulfonic acid group, a polyethylene oxide group, a polypropylene oxide group or a group having at least one of these functional groups ; R<sup>4</sup> represents a hydrogen atom or a methyl group; R<sup>5</sup> represents an alkyl group having 8 to 20 carbon atoms; M represents a hydrogen atom, an alkyl group, an aryl group, an aralkyl group, Na, K or Li; and n, x, y and z each represent a degree of polymerization.

13. The thermal recording material of claim 8, wherein a content of the boric acid is 10 to 30 % by mass based on a content of the entire polyvinyl alcohol contained in a recording surface side of the thermal recording material, and a content of the water-soluble zirconium compound is 0.1 to 10 % by mass based on a content of the entire polyvinyl alcohol contained in the recording surface side of the thermal recording material.

14. A thermal recording material comprising, on a

support, a thermal recording layer and a protective layer which comprises at least polyvinyl alcohol and two or more kinds of ultrafine inorganic particles having different average particle sizes, wherein the thermal recording material further comprises boric acid and a water-soluble zirconium compound.

15. The thermal recording material of claim 14, wherein at least one kind of the ultrafine inorganic particles is colloidal silica having an average particle size of 10 to 50 nm.

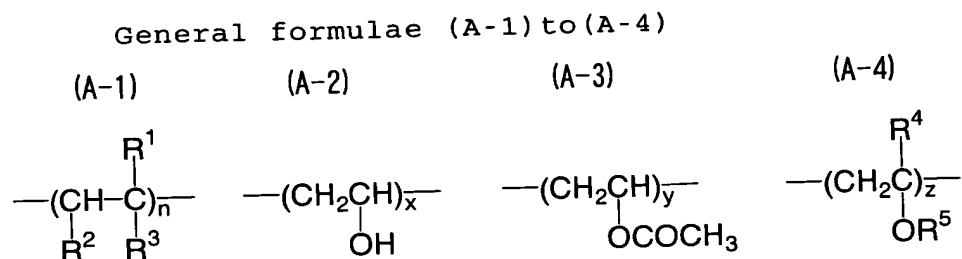
16. The thermal recording material of claim 15, wherein the other kind of the ultrafine inorganic particles is barium sulfate particles having an average particle size of 0.05 to 0.20 nm, and a composition ratio of the colloidal silica to the barium sulfate is 8 to 24 % by mass.

17. The thermal recording material of claim 14, wherein the polyvinyl alcohol is a long-chain alkyl ether-modified polyvinyl alcohol.

18. The thermal recording material of claim 14, wherein the polyvinyl alcohol is a long-chain alkyl ether-modified polyvinyl alcohol, which is modified with an alkyl ether group having 8 to 20 carbon atoms.

19. The thermal recording material of claim 14, wherein the polyvinyl alcohol is a long-chain alkyl ether-

modified polyvinyl alcohol which is comprised monomer units represented by the following general formulae (A-1) to (A-4):



wherein in general formulae (A-1) to (A-4),  $\text{R}^1$  represents a hydrogen atom, a methyl group or  $-\text{CH}_2\text{CO}_2\text{M}$ ;  $\text{R}^2$  represents a hydrogen atom, or  $-\text{CO}_2\text{M}$ ;  $\text{R}^3$  represents a hydrogen atom,  $-\text{CO}_2\text{M}$ , an amino group, an amido group, a substituted amido group, a hydroxyl group, a glycidyl group, a sulfonic acid group, a polyethylene oxide group, a polypropylene oxide group or a group having at least one of these functional groups;  $\text{R}^4$  represents a hydrogen atom or a methyl group;  $\text{R}^5$  represents an alkyl group having 8 to 20 carbon atoms; M represents a hydrogen atom, an alkyl group, an aryl group, an aralkyl group, Na, K or Li; and n, x, y and z each represent a degree of polymerization.

20. The thermal recording material of claim 14, wherein a content of the boric acid is 10 to 30 % by mass based on a content of the entire polyvinyl alcohol contained in a recording surface side of the thermal recording material, and a content of the water-soluble

zirconium compound is 0.1 to 10 % by mass based on a content of the entire polyvinyl alcohol contained in the recording surface side of the thermal recording material.